BOOK REVIEWS

THE RUST FUNGI OF CEREALS, GRASSES AND BAMBOOS by G. B. Cummins, with pp. xv + 570. Berlin, Heidelberg, New York: Springer-Verlag, 1971.

Professor Cummins has tried to fill a gap by compiling an illustrative manual of world-wide rusts of cereals, grasses and bamboos. Other monographs, e.g. Arthur (Manual of the rusts in U.S. and Canada, 1954), Gäumann (Die Rostpilze Mitteleuropas, 1959) and Wilson and Henderson (British Rust Fungi, 1966), have been confined to specific areas. Thus with the publication of the present book under review, one is waiting for other manuals of related diseases of a global nature.

The manual provides two useful keys. One is a key to species by genera of hosts. This will be more frequently used than the second one which is a series of keys to species of *Dasturella, Phakopsora, Physopella, Stereostratum, Puccinia* and *Uromyces*. Here, the author has tried to produce a system by which the rust fungi are recognized solely on the basis of their morphology, although this (as the author puts it) is a "Utopian goal" and is a very brave attempt. There are descriptions of each fungus species. Most are illustrated with excellent drawings but they all lack the basic information, e.g. identification and scale. However, the author does indicate the magnification of these drawings in the explanations section.

Doidge (The South African Fungi and Lichens, Bothalia, V, 1945) lists thirty-six *Puccinia* species, nine *Uromyces* and three *Uredo* species found on grasses in South Africa, but there appears to be a real need for a new revision of these rusts. All are described in Cummins's Manual, and this would be used as the major reference for such an investigation.

Clearly, this book will be of tremendous use to the specialist in "Uredinology", but one wonders how useful it will be to the applied plant pathologist, and the agricultural adviser. Cereal rusts have reached such specialization that one is more interested in their physiological races and the distribution of these races throughout the world. Admittedly, this would have been an extremely bold task, but if only an attempt had been made, this could have been of more use and a general reference book for the plant pathologist.

D. T. MITCHELL

THE DIVERSITY OF GREEN PLANTS by Peter Bell and Christopher Woodcock, with pp. ix + 374 and 276 figures. London: Arnold, 1971. £5; paperback £2-50.

The purpose of this book is stated by the authors to be to present a "concise account of the structure and reproduction of the varied groups of autotrophic plants, both living and extinct, proceeding from the simple to the complex". They suggest in their preface that an understanding of the results of research on problems of growth and development is facilitated by an awareness of the inter-relationships of the organism used. They have produced a more or less conventional comparative study of the eutrophic plants, with very occasional reference to physiological aspects.

The text is accurate and readable, based primarily on a description of a series of types. The flowering plants are treated differently, referring to examples, but not employing types or taxonomic subdivisions of this group.

A glossary defines some 450 terms, not defined in the text. There is a list of references, but no sources for extra reading. The index is comprehensive, but would have been more useful had some of the entries been further subdivided. One finds, for example, a bewildering array of forty references under the entry "sporangium"! The illustrations are quite adequate both in quality and in relevance.

This edition does not differ greatly from the first. Several illustrations have been redrawn and there are a few additional ones. One of the more obvious alterations to the text has been the recognition of the Metzgeriales as being distinct from the Jungermanniales. However the only change made to incorporate this order is to replace the term "Jungermanniales" with the phrase "Jungermanniales and Metzgeriales", with no explanation of any differences between these orders.

The printing of text, half-tone and line illustrations is clear, but the lettering of the spine is not as legible as it might be.

"The diversity of green plants" is probably too detailed for first year university students and insufficient for use as the principal source for senior students. Nevertheless, several

South African universities have prescribed the first edition for use by both first year and more senior students, and it would certainly provide a reliable and readable reference work as a background to more specialised studies.

J. P. Jessop

Trees Structure and Function by Martin H. Zimmerman and Claud M. Brown with pp. xiv + 336 and 111 illus. Berlin, Heidelberg, New York: Springer-Verlag, 1971. $19,80.

This is a modern account of major questions of the physiological anatomy of trees. The authors presuppose basic knowledge of plant anatomy and physiology and proceed to explain the relations between growth, structure and function in trees. The approach is that which has been applied to explain the structure and life of forest trees by Büsgen and Münch.[1]

This book should be of considerable value as a reference work for intensive study by senior botany students and post-graduate research workers in botany, forestry and related fields. The basic botanical training of undergraduates in the applied sciences of forestry, agriculture and horticulture is generally somewhat limited and they may find the terminology unfamiliar and the numerous references confusing.

There are seven chapters, i.e. on primary growth; secondary growth; growth and form; transport in the xylem; transport in the phloem; the steady state thermodynamics of translocation in plants, and storage, mobilization and circulation of assimilates. The subject index is adequate and the author index of six pages, is comprehensive. The chapters are followed by extensive lists of the literature cited, and these cover a total of 25 closely printed pages. This bibliography alone makes the book very valuable for botanists, who investigate the physiological anatomy of plants, and particularly, forest scientists engaged in silvicultural and wood technological research.

The foundations of silviculture (silvics) have, in the past, been predominantly ecological. It has been attempted to explain *what* the relations of trees to their environment (autecology) and their inter-relations in forest communities (synecology) are. Research into silvicultural practice has aimed at determining *what* the effects of treatments applied in experiments are. Fundamental knowledge of the relations between the structure and function of cell-tissues, organs and whole trees, as set forth in this book, is needed, however, to understand *why* trees and forests stands react in particular ways to their environments and in associations, and also *why* silvicultural treatments cause stands to respond in particular ways.

The information in the chapters by Brown on primary growth, secondary growth and growth and form, is needed by the silvicultural researcher and, as the object of commercial forestry is to produce timber of desirable quality, the knowledge presented in these chapters is also needed if silviculturists and wood technologists are to co-operate successfully to this end. Thus, to select but one example, the section on reaction wood is of particular interest in relation to the problem of the warping of South African pine timber, caused by the formation of such wood.

Growth and form of trees is described with reference to the aerial parts and roots are considered only rather briefly in sections of the first and second chapters. Fuller information on roots as presented, for example, by Köstler, Brückner and Bibelriether,[2] could profitably have been included.

The problems of transport in the xylem and the phloem, dealt with in chapters four and five, are obviously significant in connection with the study of the water relations of trees, the hydrological effects of forests, the intake of solutes from the soil and the distribution of photosynthetic products through tree systems. This applies also to the question of storage, mobilization and circulation of assimilates discussed in chapter seven.

Basic research into trees, structure and function has been either physiological or physical. This book has presented, collated and discussed physiological information mainly. The mathematical-physical chapter by Tyree does not fit quite logically into the pattern of the book. Most students may want to skip this chapter or perhaps return to it after they have more fully studied the physical reactions determining the input and output of energy, water, carbon, oxygen, nitrogen and minerals to and from tree systems.

The complete subject matter of the physiological anatomy of trees is not dealt with. The three main fields covered are: growth, by Brown; transport and storage, by Zimmerman; and thermodynamics of translocation, by Tyree. The chapters by the individual authors are excellent contributions on selected subjects rather than integrated parts of a comprehensive treatment.

The overall appearance, quality and accuracy of the text, quality, accuracy and relevancy of illustrative matter and the balance between illustrations and text are all of the highest standard.

1. Büsgen, M. & E. Münch, 1927. "Waldbäume" *Verlag von Gustav Fischer, Jena.*
2. Köstler, J. N., E. Brückner & H. Biebelriether, 1968. "Die Wurzeln der Waldbaume" *Verlag Paul Parey, Hamburg & Berlin.*

C. L. Wicht

Pollen: Development and Physiology, ed. by J. Heslop-Harrison, with pp. xi + 338. London: Butterworths, 1971.

The contents of this book are clearly summarised in the foreword by Dr. Erdtman who states: "The reviews and abstracts published in this book are an up-to-date synopsis of new acquisitions and ideas within the fertile field of pollen physiology, concerning the living pollen grains, their growth and essential biological functions."

In the preface, the editor Professor Heslop-Harrison explains that the contents of the book were derived from extended versions of papers and abstracts of research reports given at three meetings held in the State of Washington, U.S.A., during August, 1969. Two meetings in Pullman were held under the auspices of the American Association for the Advancement of Science and the one in Seattle formed part of the work of the XIth International Botanical Congress.

The contents of the book, defined by the editor as a text book is divided into five sections. Section one deals with "The nucleus and cytoplasm in microsporogenesis" (two reviews and two abstracts). Section 2 is entitled "Pollen Development and the Pollen grain wall" (three reviews and seven abstracts). Section 3 on "Pollen and Pollen Tube metabolism" contains four reviews and nine abstracts while Section 4 is called "Pistil-Pollen interactions" consisting of one review and four abstracts. The final section is headed "Incompatibility" and comprises one review and three abstracts.

It is apparent from the very brief description of the book given above that all the important developmental and physiological aspects of pollen are dealt with. Adequate lists of references are given with each review and research abstract.

This is an admirable book for senior students and research workers in this specialised field and no university library should be without it.

E. S. Twyman

Flora of New Zealand Vol. II by L. B. Moore and E. Edgar with pp. xl + 354, 4 Maps, 43 text figs. Wellington: A. R. Shearer, Government Printer, 1970. $4,50 (N.Z.).

When compared with other Southern Hemisphere countries, New Zealand has fared very well as regards the writing of a standard flora. While most of these countries count themselves fortunate to have even one published flora, New Zealand has had 3; starting with Hooker's *Handbook of the New Zealand Flora* (1867), followed by Cheeseman's *Manual of the New Zealand Flora* (1906) and now the *Flora of New Zealand*, of which volume II is reviewed here. This progress is undoubtedly due to the fact that the number of taxa to be dealt with is vastly smaller than for most other countries. The number of species of vascular plants making up the New Zealand flora is about 1 460, that is, somewhat more than half the number recorded for the Cape Peninsula.

Despite this numerical advantage, 9 years have passed since the appearance of volume I, which dealt with vascular cryptogams and dicotyledons. With the exception of the Graminae, volume II enumerates the Monocotyledons. Presumably the Graminae will receive attention at a later date. The major cause of the delay in the appearance of volume II is apparently not due to the ponderous progress of orthodox taxonomy which bogs down so many floras, but is largely due to the inclusion of some biosystematic data. In the preface we learn that the authors were able "to grow a large proportion of the species and obtain some experimental evidence about hybridization". Moreover, chromosome numbers are listed for half the taxa enumerated in volumes I and II. There can be few floras in the world for which such claims can be made.

Another interesting feature of this work is that the families have been arranged according to Hutchinson's classification. Keys to the families, genera and species are provided and are clearly set out with well contrasting couplets. For many genera there are excellent line drawings of the diagnostic parts, those depicting the columns of *Thelymitra* (Orchidaceae) being particularly notable. Predictably, a family like the Orchidaceae tends to get extra attention, but in this publication even the Cyperaceae are well catered for with fine line drawings.

Throughout the text, abundant references to papers of relevance are provided in the critical discussions following the species descriptions. In addition, an "Annals of Taxonomic Research" on New Zealand vascular plants has been compiled, listing papers published between 1959 and 1968, together with papers dating from 1780 that were not included in a similar list in volume I. A subject index to the "Annals", arranged alphabetically under families, greatly enhances the value of this reference source. A glossary of botanical terms and corrigenda to volume I complete the text. Maps on the end papers depict the New Zealand Botanical Region, the Southern Islands in relation to the larger land masses and details of both South and North Islands of New Zealand.

Much thought has evidently gone into the production of this excellent book in which it is hard to find deficiencies or omissions. One must congratulate Dr. Edgar and Dr. Moore for producing so compact and handy a book containing so much information. It will undoubtedly be an invaluable reference work for all taxonomists in the Southern Hemisphere. This book is very moderately priced.

J. P. ROURKE

INSTRUCTIONS TO CONTRIBUTORS TO THE JOURNAL OF SOUTH AFRICAN BOTANY

This Journal provides a medium for the publication of the results of botanical research primarily on the flora of Southern Africa, whether systematic, morphological, ecological or otherwise and whether carried out in South Africa or elsewhere. Papers on botanical subjects of special interest and application in South Africa may be included.

Contributions must be original and should not be translations of previously published papers.

Papers must be submitted in final, corrected form. They are accepted for publication on the recommendation of the Editorial Committee.

Authors may be charged expenses for corrections if alterations are excessive.

COPY

Papers should be type-written, double spaced throughout on one side of the paper and with margins of at least 3 cm (1 inch). Footnotes and elaborate tables should be avoided. Latin binomials should be underlined once to indicate italics. All other marking of copy should be left to the Editor. The original, plus at least one carbon copy, must be submitted.

GENERAL LAY-OUT

Each paper should be headed with a concise informative **title** in capitals with the author's name below. This should be followed by the name of the institution, where the work was carried out, underlined and placed within brackets.

A concisely written **abstract** in English and Afrikaans, of not more than 200 words, should precede the text.

The subject matter should be divided into sections under short appropriate **headings** such as: INTRODUCTION, MATERIAL AND METHODS, RESULTS, DISCUSSION, CONCLUSION, ACKNOWLEDGMENTS, etc.

Tables and **illustrations** should be on separate sheets. **Figures** and **graphs** should be in Indian ink on white card or Bristol board. Lettering for figures can be inserted by the printers in which case authors should indicate the desired lettering on the original figure lightly in pencil. The maximum dimensions available for figures are 18 cm × 12 cm (7″ × 4½″). Line drawings for blocks should be at least twice the size they will be when reduced for publication. All figures should be supplied with a scale. The most suitable method of indicating magnification is a scale line (in metric units) incorporated in the figure. Photographs for half-tone reproductions should be on glossy paper, clearly marked on the reverse side (in pencil) to indicate the top. Line drawings and half-tone illustrations are termed figures and should be numbered consecutively. Captions for figures should be typed on a separate sheet of paper.

TAXONOMIC PAPERS

Authors must adhere to the International Rules of Botanical Nomenclature. **Abbreviations** and **herbaria** must be cited in accordance with the most recent edition of Index Herbariorum, Pt 1 (The Herbaria of the World, 5th ed., 1964). When **new species** are described, the exact location of type material must be indicated. When proposing **new combinations** the full citation of the basionym is required. **Indented keys** with numbered couplets are preferred when dealing with a small number of taxa. **Bracket keys** should be used when dealing with a large number of taxa. When citing **synonyms** they should be arranged chronologically into groups of nomenclatural synonyms and these should be arranged chronologically by basionyms. Whenever possible, the types of the basionyms should be cited, e.g.:

Bequaertiodendron magalismontanum (Sond.) Heine & J. H. Hemsley in Kew Bull. **1960**: 307 (1960).
Chrysophyllum magalismontanum Sond. in Linnaea **23**: 72 (1850). Type: Magaliesberg, *Zeyher*, 1849 (S, holo; BOL!, SAM!).
Zeyherella magalismontana (Sond.) Aubrév. & Pellegr. in Bull. Soc. bot. Fr. **105**: 37 (1958).
Pouteria magalismontana (Sond.) A. Meeuse in Bothalia **7**: 335 (1960).
Chrysophyllum argyrophyllum Hiern, Cat. Afr. Pl. Welw. **3**: 641 (1898). Syntypes: Angola, *Welwitsch* 4827, 4828, 4829 (BM!).
Boivinella argyrophylla (Hiern) Aubrév. & Pellegr. in Bull. Soc. bot. Fr. **105**: 37 (1958).
Chrysophyllum wilmsii Engl., Mon. Sapot. Afr.: 47 t. 16 (1904). Type: Transvaal *Wilms* 1812 (B†, holo.; K!).
Boivinella wilmsii (Engl.) Aubrév. & Pellegr. in Bull. Soc. bot. Fr. **105**: 37 (1958).

CITATION OF SPECIMENS

In the interests of uniformity contributors are requested to follow the recommendations of the Botanical Research Institute, Pretoria (Technical note: Gen. 4, Oct., 1967) by citing specimens according to the one degree grid system. Distribution data are given separately for each province and are arranged in the following sequences: South West Africa, Botswana, Transvaal, Orange Free State, Swaziland, Natal, Lesotho, Cape. Within each province degree squares are listed in numerical sequence, i.e., from west to east and from north to south. Whenever possible locality records should be given to within a quarter degree square. The collectors' names and numbers are underlined (printed in italics) to avoid confusion with the numbers of the degree squares, e.g.: NATAL-2829 (Harrismith): Cathedral Peak Forest Station (-CC), *Killick* 5127 (PRE); . . . CAPE-3418 (Simonstown): Hottentots Holland mountains, Somerset Sneeukop (-BB), Nov., *Stokoe s.n.* sub. SAM *56390* (SAM).

REFERENCES

These should be given in the text as follows: Jones (1968) or (Jones, 1968) or, where reference to a specific page is required, Jones (1968:57) or (Jones,1968:57). **Literature cited** should be arranged alphabetically by surnames, chronologically within each name, with suffixes a, b, etc., to the year for more than one paper by the same author in that year. Titles of **periodicals** must be abbreviated according to the *World List of Scientific Periodicals*, 4th ed., London: Butterworth or when unable to trace the title in this list (as will be the case in taxonomic papers where abbreviations of 18th and 19th century periodicals art required) the abbreviations given in *Botanico-Periodicum-Huntianum*, Pittsburgh: Hune Botanical Library, 1968, should be followed. Periodical titles should be underlined once (for italics). If an author is unable to determine the correct abbreviation of a journal title he is advised to type it out in full and leave its abbreviation to the Editor. Titles of **books** should be underlined and given in full, together with the place of publication, name of the publisher and an indication of the edition if other than the first; e.g.:

Davis, P. H. and Heywood, V. H., 1963. *Principles of Angiosperm Taxonomy*. Edinburgh and London: Oliver and Boyd.

Riley, H. P., 1960. Chromosome numbers in the genus *Haworthia*. *Jl S. Afr. Bot.* **26**: 139–148.